Amendments to the claims

Please amend the following claims to resolve the issue of multiple-dependent claims depending on other multiple-dependent claims, correct spelling errors and narrow down certain claims to resolve potential issues with other patents.

Claim 1 (currently amended)

An improved operation of disk drive read-ahead (pre-buffering) logic implementing the immediate fetching of data from a plurality of heads simultaneously after completing any seek operation, without waiting or skipping sectors coming before the sector addressed by the operation requiring a seek, if any, or waiting for other heads to complete any operation whatsoever.

Claim 2 (currently amended)

An improved operation of disk drive reading and writing technology implementing simultaneous reads and writes on plurality of data surfaces on which the heads are already positioned and aligned, regardless of locations of other heads, whatever the data surfaces are for the cylinder where the used heads are, whatever data organization is used and whatever above-mentioned way of achieving precise positioning of all heads at the same time is used.

Claim 3 (currently amended)

An improved operation of claim 2 wherein the order of recorded data (data sectors) is reorganized to be ordered first by surfaces, then by cylinder/track sectors, then by cylinders unlike prior-art ordering by track/cylinder sectors, then by surfaces, then by cylinders, whereas sectors or sector stripe interleave corresponds to the number of separate, independent, actuator arms (in order to allow simultaneous reads of subsequent sectors or sector stripes by heads from different arms).

Claim 4 (currently amended)

An improved operation of claim 2 wherein additional control information (such as parity) is stored along with raw data ~~(such as on separate control data surface(s), allowing for control data surfaces to be different for different cylinders and sectors)~~ (such that the control data can be read more or less at the same time as the raw data by being dispersed within the raw data, or at different locations accessible by other available heads at more or less the same time but excluding pure parity information on a single dedicated platter) allowing correct disk reads and writes of any sector even if one or more surfaces of said sector is inaccessible for any reason (such as surface damage or head failure).

Claim 5 (currently amended)

An improved operation of claim 2 wherein each smallest addressable chunk of data (data sector) is ~~stripped~~ striped to a plurality (two or more) of ~~data surfaces~~ segments accessible by a plurality of heads at more or less the same time, whatever the ~~data surfaces~~ said segments are for the cylinder where the used heads are except when all the heads are located on a single actuator and there is only one head per surface.

Claim 6 (currently amended)

An improved operation of claim 5 wherein additional control information (such as parity) is stored along with raw data ~~(such as on separate control data surface(s), allowing for control data surfaces to be different for different cylinders and sectors)~~ (such that the control data can be read more or less at the same time as the raw data by being dispersed within the raw data, or at different locations accessible by other available heads at more or less the same time but excluding pure parity information on a single dedicated platter) allowing correct disk reads and writes of any data sector of data even if one or more surfaces of said data sector is inaccessible for any reason (such as surface damage or head failure).

Claim 7 (currently amended)

An improved operation of claim 6 wherein the disk drive system interface and/or supported command/communication protocol is/are capable of informing the host system of the error or failure condition handled by the improvement of claim 6 <u>synchronously (as a result of the requested operation) or asynchronously (as device-initiated event) without the host having to separately demand device health report.</u>

Claim 8 (currently amended)

An improved disk drive system comprising of more than one read/write head or head pair for every surface<u>, each capable of reaching any cylinder</u>, being or not being independent of each other, limited or not limited to being on the same cylinder at the same time and being or not being on the same head arm or actuator, limited or not limited to being on the same zone at the same time, whether the heads have fixed positions or not, whatever the total number of heads or heads per arm is used, whatever the implementation, technology, materials or manufacturing process is used for any single component of the said system and whether all or only some heads are capable of either reading or writing data.

Claim 9 (original)

An improved operation reading and writing logic of disk drive system of claim 8 implementing simultaneous reads and writes on plurality of data surfaces, whatever the data surfaces are for the cylinder where the used heads are.

Claim 10 (currently amended)

An improved operation of claim 8 wherein the order of recorded data is reorganized to be ordered first by surfaces, then by track/cylinder sectors, then by cylinders unlike prior-art ordering by track/cylinder sectors, then by surfaces, then by cylinders, whereas sectors or sector stripe interleave corresponds to the number of separate, independent, actuator arms (in order to allow simultaneous reads of subsequent sectors or sector stripes by heads from different arms)

Claim 11 (currently amended)

An improved operation of claim 8 wherein additional control information (such as parity) is stored along with raw data (such as on separate control data surface(s), allowing for control data surfaces to be different for different cylinders and sectors) (such that the control data can be read more or less at the same time as the raw data by being dispersed within the raw data, or at different locations accessible by other available heads at more or less the same time but excluding pure parity information on a single dedicated platter) *allowing correct disk reads and writes of any sector even if one or more surfaces of said sector is inaccessible for any reason (such as surface damage or head failure).*

Claim 12 (currently amended)

An improved operation of claim 8 wherein each smallest addressable chunk of data (data sector) is ~~stripped~~ striped to a plurality (two or more) of ~~data surfaces~~ segments accessible by a plurality of heads at more or less the same time, whatever the ~~data surfaces~~ said segments are for the cylinder where the used heads are except when all the heads are located on a single actuator and there is only one head per surface.

Claim 13 (currently amended)

An improved operation of claim 8, or alternatively the claims 9, 10, 11 or 12 wherein the controller of the said disk drive system is capable of handling the situation when ~~one or more heads or head pairs fail~~ more than one head fails, as long as there is at least one working head (or one working read and one working write head) per surface (and per zone if heads are assigned to zones).

Claim 14 (currently amended)

An improved operation of claim 12, ~~or alternatively the claim 13,~~ alternatively improved to be able to handle multiple head failures as long as at least one head is operational per surface, wherein additional control information (such as parity) is stored along with raw data (such as on separate control data surface(s), allowing for control data surfaces to be different for different cylinders and sectors) allowing correct disk reads and writes of any sector of data even if one or more surfaces of said sector is inaccessible for any reason (such as surface damage or head failure).

Claim 15 (currently amended)

An improved operation of ~~claim 13, or alternatively the claim 14~~ hard disk drive system capable of actuator, head, surface, platter or other single or multiple error recovery, wherein the disk drive system interface and/or supported command/communication protocol is/are capable of informing the host system of the error or failure condition handled by ~~the improvement of said claim~~ used error recovery system.

Claim 16 (currently amended)

An improved operation of ~~claim 8 or, alternatively, claims 9, 10, 11,12, 13, 14 or 15~~ <u>hard disk drive system capable of a plurality of simultaneous reads and/or writes on different platters, surfaces and/or angles,</u> wherein the disk drive system interface and/or supported command/communication protocol is/are capable of accepting future operation profile information from the host system, for the purpose of optimizing the operation of the disk drive system (most importantly, movement of head arms)

Claim 17 (currently amended)

An improved operation of claim ~~8, 9, 10, 11, 12, 13, 14, 15 or~~ 16 <u>or other hard disk drive system capable of a plurality of simultaneous reads and/or writes on different platters, surfaces and/or angles,</u> wherein the disk drive system interface and/or protocol is/are supported command/communication capable of accepting a plurality of commands from one host and/or more clients by queuing them, optimizing the operation of the disk drive system and being able to reorder the execution of these commands.

Claim 18 (original)

An improved operation of claim 17 wherein the disk drive system interface and/or supported command/communication protocol is/are capable of simultaneously receiving new commands and new data and sending any requested data back to any host or client, limited or not limited to supporting two-way communication only with one host or client at a time, limited or not limited to supporting the two-way communication with two different hosts/clients at a time only.

Claim 19 (currently amended)

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A way of achieving the fine-positioning of hard disk drive heads by means of additional piezo-electric effect driven mechanism mounted on main (base) actuator arms for the purpose of achieving either faster head positioning time or local head ~~movemenet independece~~ movement independence or both